

CLAIMS

What is claimed is:

1. A device for coupling bone across a fracture or osteotomy, comprising:
a plate having an upper surface and a lower surface, and including at least two bone fixation regions and a bridge region disposed between the bone fixation regions, each bone fixation region having at least one aperture and the bridge region defining a gap between the bridge region and the bone to allow for engagement of the bridge region by a suitable severing device; and
a fastening device adapted to be disposed through the apertures and engaging the plate to secure the bone fixation regions to one or more portions of bone.
2. The device of Claim 1, wherein the apertures are internally threaded.
3. The device of Claim 2, wherein the fastening device is comprised of an externally threaded lower shaft portion for engaging the bone, an externally threaded upper shaft portion, and a head member that is internally threaded for engaging the upper shaft portion.
4. The device of Claim 3, wherein the head member is externally threaded for engaging one of the internally threaded apertures.
5. The device of Claim 3, wherein the fastener includes a flange portion between the lower shaft portion and the upper shaft portion.

6. The device of Claim 1, wherein the fastening device is made from a bio-resorbable material.

7. The device of Claim 1, wherein the fastening device is made from a bio-compatible material.

8. The device of Claim 1, wherein the fastening device includes a pointed end portion.

9. The device of Claim 1, wherein the apertures are arranged in an asymmetric pattern.

10. The device of Claim 1, wherein the bridge region is aligned so as to span the fracture or osteotomy.

11. The device of Claim 1, wherein the bridge region is aligned so as to span the bone.

12. The device of Claim 1, wherein the bridge region is longitudinally disposed at an angle relative at least one of the bone fixation regions.

13. The device of Claim 1, wherein the bridge region is longitudinally disposed at an angle relative both of the bone fixation regions.

14. The device of Claim 1, wherein an additional bridge region extends from the bridge region, the additional bridge region terminating in an additional bone fixation region.

15. The device of Claim 1, wherein the bone fixation region includes an angled portion extending upwardly in a plane of the bridge region.

16. The device of Claim 15, wherein the bone fixation region includes the angled portion and a planar portion generally coplanar with the bridge region.

17. The device of Claim 1, wherein the device is comprised of at least four bridge regions with each bridge region coupled to two or more bone fixation regions.

18. The device of Claim 17, wherein the bone fixation regions extend angularly from the bridge region.

19. The device of Claim 18, wherein the bone fixation regions have at least two apertures.

20. The device of Claim 1, wherein the bone fixation regions are coupled on one or more ends to one or more intersecting bridge regions.

21. The device of Claim 1, wherein the bone fixation regions are coupled on one or more ends to one or more bridge regions, one of the one or more bridge regions defining a common bridge region.

22. The device of Claim 1, wherein the bridge region is multiple bridge regions terminating in bone fixation regions and disposed in a parallel relationship to each other and interconnected by a backbone.

23. The device of Claim 1, wherein the bridge region has an arched portion so as to create the gap between the bridge region and the bone when the device is secured to the bone.

24. The device of Claim 1, wherein the bone fixation regions include a portion disposed generally linearly with the bridge region and a stepped portion offset from the linear portion.

25. The device of Claim 1, further comprising at least one foot engaging and elevating at least one of the bone fixation regions to create the gap between the bridge region and the bone.

26. The device of Claim 1, wherein the bridge region contains a notch.

27. The device of Claim 1, wherein the bridge region is pre-stressed.

28. The device of Claim 27, further comprising at least one hook connected to the bone fixation region, the at least one hook including a bone contact surface and an outer surface.

29. The device of Claim 28, wherein the hook extends from the bone fixation region at an end opposite the bridge region to engage the bone laterally.

30. The device of Claim 1, further comprising a slot disposed between at least one of the apertures and a perimeter surface of the plate.

31. The device of Claim 1, wherein the plate includes bio-resorbable material.

32. The device of Claim 1, wherein the plate includes bio-compatible material.

33. A device for coupling bone across a fracture or osteotomy, comprising:

a plate having an upper surface and a lower surface, and including at least two bone fixation regions and a bridge region disposed between the bone fixation regions, each bone fixation region having at least one aperture and the bridge region defining a gap between the bridge region and the bone to allow for engagement of the bridge region by a suitable severing device; and

wherein the bridge regions and bone coupling regions are arranged in a configuration suitable for securing two or more regions of severed bone together.

34. The device of Claim 33, further comprising a fastening device adapted to be disposed through the apertures and engaging the plate to secure the bone fixation regions to one or more portions of bone.

35. The device of Claim 34, wherein the fastening device is capable of engaging the aperture and securing the bone fixation regions to one or more portions of severed bone.

36. The device of Claim 34, wherein the fastening device is comprised of an externally threaded lower shaft portion for engaging a bone, an externally threaded upper shaft portion, and a head member that is internally threaded for engaging the upper shaft portion.

37. The device of Claim 36, wherein the head member is externally threaded for engaging one of the internally threaded apertures.

38. The fastening device of Claim 36, wherein the fastener includes a flange portion between the lower shaft portion and the upper shaft portion.

39. The device of Claim 34, wherein the fastening device is made from a bio-resorbable material.

40. The device of Claim 34, wherein the fastening device is made from a bio-compatible material.

41. The device of Claim 34, wherein the fastening device includes a pointed end portion.

42. The device of Claim 33, wherein the internal apertures are arranged in an asymmetric pattern.

43. The device of Claim 33, wherein the apertures are internally threaded.

44. The device of Claim 33, wherein one or more of the bridge regions are aligned so as to span the fracture or osteotomy.

45. The device of Claim 33, wherein one or more of the bridge regions are aligned so as to span the bone.

46. The device of Claim 33, wherein the bridge region is longitudinally disposed at an angle relative at least one of the bone fixation regions.

47. The device of Claim 33, wherein the bridge region is longitudinally disposed at an angle relative both of the bone fixation regions.

48. The device of Claim 33, wherein an additional bridge region extends from the bridge region, the additional bridge region terminating in a bone fixation region.

49. The device of Claim 33, wherein the bone fixation region includes an angled portion extending upwardly in a plane of the bridge region.

50. The device of Claim 49, wherein the bone fixation region includes the angled portion and a planar portion generally coplanar with the bridge region.

51. The device of Claim 33, wherein the device is comprised of at least four bridge regions with each bridge region coupled to two or more bone fixation regions.

52. The device of Claim 51, wherein the bone fixation regions extend angularly from the bridge region.

53. The device of Claim 52, wherein the bone fixation regions have at least two apertures.

54. The device of Claim 33, wherein the bone fixation regions are coupled on one or more ends to one or more intersecting bridge regions.

55. The device of Claim 33 wherein the bone fixation regions are coupled on one or more ends to one or more bridge regions, one of the one or more bridge regions defining a common bridge region.

56. The device of Claim 33, wherein the bridge region is multiple bridge regions terminating in bone fixation regions and disposed in a parallel relationship to each other and interconnected by a backbone.

57. The device of Claim 33, wherein the bridge region has an arched portion so as to create the gap between the bridge region and the bone when the device is secured to the bone.

58. The device of Claim 33, wherein the bone fixation regions include a portion disposed generally linearly with the bridge region and a stepped portion offset from the linear portion.

59. The device of Claim 33, further comprising at least one foot engaging and elevating at least one of the bone fixation regions to create the gap between the bridge region and the bone.

60. The device of Claim 33, wherein the bridge region contains a notch.

61. The device of Claim 33, wherein the bridge region is pre-stressed.

62. The device of Claim 61, further comprising at least one hook connected to the bone fixation region, the at least one hook including a bone contact surface and an outer surface.

63. The device of Claim 62, wherein the hook extends from the bone fixation region at an end opposite the bridge region to engage the bone laterally.

64. The device of Claim 33, further comprising a slot disposed between at least one of the apertures and a perimeter surface of the plate.

65. The device of Claim 33, wherein the plate includes bio-resorbable material.

66. The device of Claim 33, wherein the plate includes bio-compatible material.

67. A method for reapproximating and coupling previously severed and separated bone regions so that the bone regions may be subsequently re-separated comprising:

providing an elongated plate used to secure reapproximated bone regions, the elongated plate having a plurality of bone fixation regions and a bridge region therebetween, each of the plurality of bone fixation regions having at least one aperture, the bridge region defining a gap between the bridge region and the bone to allow for engagement of the bridge region by a suitable severing device; and

severing the bridge region using a suitable cutting device so as to allow for the easy re-separation of the previously reapproximated and secured bone regions.

68. The method of Claim 67, further comprising the step of providing a bone reapproximation device to laterally hook and reapproximate the separated bone regions.

69. The method of Claim 67, further comprising the step of fastening the bone coupling device to the reapproximated bone regions using a fastener.

70. The method of Claim 67, wherein the fastener includes an upper shaft portion, a lower shaft portion, and a head member removably attached to said upper shaft portion.

71. The method of Claim 67, wherein the step of severing includes cauterizing the bridge region.